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PUSH BUTTON OPERATED MASTER SWITCH

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2 Sheets-Sheet 1

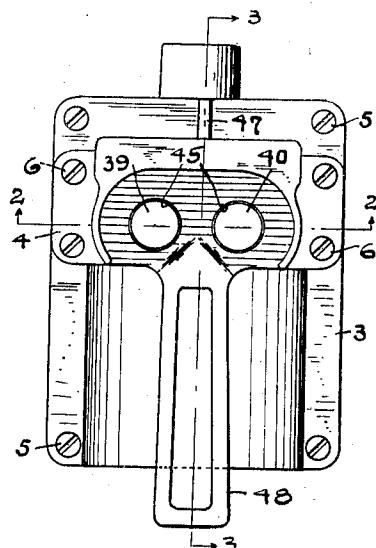


FIG. 1

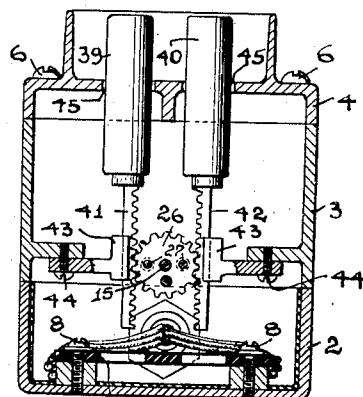


FIG. 2

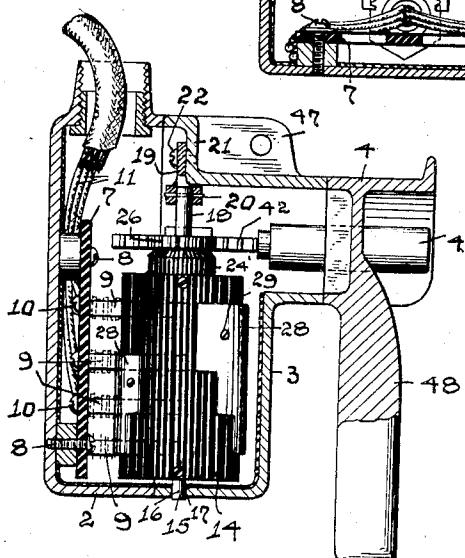


FIG. 3

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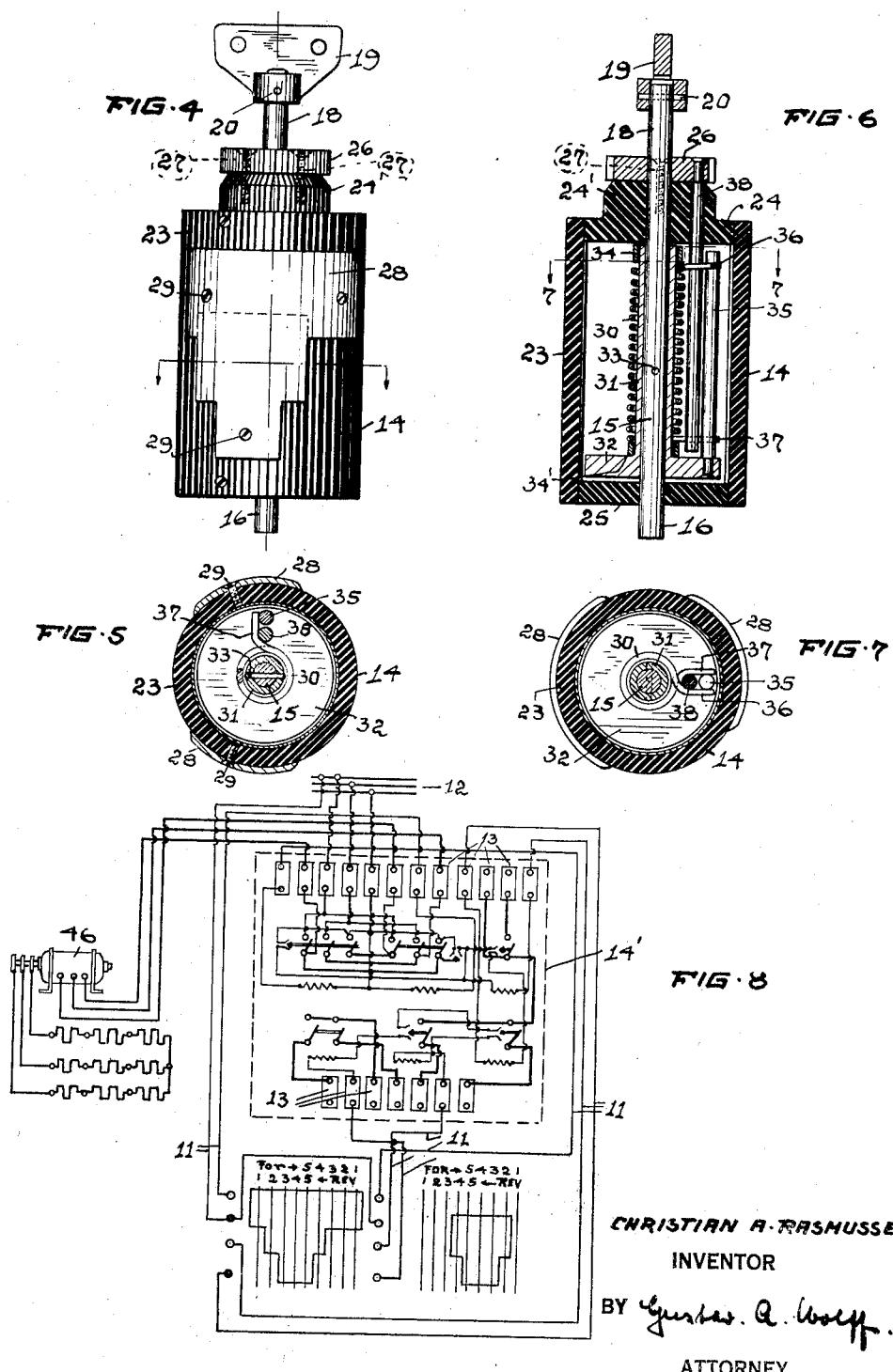
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UNITED STATES PATENT OFFICE

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PUSH BUTTON OPERATED MASTER SWITCH

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3 Claims. (Cl. 200—17)

This invention relates to master switches adapted to control the current supply to electric motors by the medium of magnetic contactors, and more particularly to push button operated master switches.

Presently known master switches of the push button type embody a plurality of individual, independent push button switches, each of which controls an individual circuit. It is well known, 10 that the operation of these individual push button switches complicates the control of the master switch and also necessitates a special cut-out switch, to permit of the current being cut off, when one or the other of the push button switches 15 sticks or should get out of order.

The primary object of the present invention is the provision of a simplified push button operated master switch, having only two coupled push buttons, each of which is adapted to control a plurality of circuits, the push buttons being coupled with each other to prevent their independent operation.

Another object of the invention is the provision of a push button operated master switch with two coupled push buttons, each of which is adapted to control a plurality of circuits, and with means for automatically and simultaneously returning the push buttons to their neutral position, when the buttons are released by the operator.

A further object of the invention is the provision of a simplified push button operated master switch with two coupled push buttons actuating a multi-contact switch, which switch is adapted to control a plurality of circuits for multi speed forward and reverse rotation of a motor.

Still another object of the invention is the provision of a simplified push button operated master switch with two push buttons actuating upon a rotary switch drum adapted to control a plurality of circuits for multi speed forward and reverse rotation of a motor.

A still further object of the invention is the provision of a simplified push button operated master switch with two push buttons, coupled with each other and with a rotary switch drum adapted to selectively open and close a plurality of circuits for multi-speed forward and reverse rotation of a motor, the switch drum being provided with means for automatically rotating same and the push buttons coupled therewith to neutral position.

In addition the invention has certain other marked superiorities, which radically distinguish it from presently known structures. These improvements or superior characteristics embodying 55 certain novel features of construction are set forth

in the appended claims, and a preferred form of embodiment of the invention is hereinafter shown with reference to the accompanying drawings forming part of the specification.

In these drawings:

Figure 1 is a front elevation of a push button operated drum master switch according to the invention.

Figure 2 is a cross sectional view through the push button operated drum master switch shown in Figure 1, the section being taken on line 2—2 of Figure 1.

Figure 3 is a longitudinal sectional view through the push button operated drum master switch shown in Figure 1, the section being taken on line 3—3 of Figure 1.

Figure 4 is a front elevation of the drum or cylinder of the push button operated master switch.

Figure 5 is a cross sectional view through Figure 4, the section being taken on line 5—5.

Figure 6 is a longitudinal sectional view through Figure 4, the section being taken on line 6—6.

Figure 7 is a cross sectional view through Figure 6, the section being taken on line 7—7.

Figure 8 is a wiring diagram for a magnetic reversing panel with five speed points and with a five position push button operated master switch, as shown in Figures 1-7, for the control of a slip ring motor.

Referring more particularly to the drawings, the push button master switch embodies a housing having a base 2, a middle portion 3 and a cover 4, the base, the middle portion and the cover being rigidly connected to each other by means of screws 5 and 6 respectively. The box-shaped base mounts a bakelite or fiber plate 7, which plate is rigidly secured to the base by means of screws 8, and this fiber plate carries two rows of spaced contact members 9, which members are attached to said plate by means of screws 10. The contact members 9 are electrically connected by means of leads 11 with the net 12 and with the contacts 13 of a magnetic reversing panel 14, which panel is provided with five speed points, see Figure 8. The contact members 9 cooperate with a rotatable switch drum 14, which drum is mounted to rotate around a fixed shaft 15, having its lower end 16 guided in a bore 17 in the middle portion 3 and its upper end 18 pinned to a bracket 19 by means of a pin 20. The bracket 19, which is rigidly secured to the wall 21 of the middle portion 3 by means of screws 22 suspends the shaft 15 and prevents its rotation, so that the drum 14 is properly guided during switching operations.

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The drum 14, which is made of bakelite or other suitable insulating material, embodies a hollow cylinder 23, having its open top and bottom portions closed by fiber discs 24, 25 respectively. The top disc 24 is provided with a cylindrical extension 24', supporting a gear 26, which gear is rigidly attached to said extension by means of screws 27, so that the cylinder 23, its top disc 24 and the gear 26 rotate jointly around the shaft 15, when the gear 26 is actuated upon by mechanism hereinafter to be described. The outer surface of the cylinder 23 of the drum 14 carries two, substantially oppositely arranged contact segments 28, which segments are secured to the cylinder 23 by means of screws 29. These contact segments 28 cooperate with the contact members 9, when the drum 14 is rotated and thus permit of a plurality of circuits being opened and closed by rotation of the drum 14.

The drum 14 can be rotated in either direction against the torsional force of a spring 30, which spring tends to automatically rotate said drum to a neutral position, in which the segments 28 and the contact members 9 are separated from each other and no current flows through the switch. This spring is sleeved upon the elongated hub 31 of a disc 32 having its hub sleeved upon the shaft 15 and secured thereto by means of a pin 33. A pair of collars 34, 34' holds the spring 30 in proper position upon the hub 31. The disc 32 carries close to its peripheral edge an upwardly extending post 35, which post is engaged at opposite sides by the laterally extended free ends 36 and 37 of the spring 30, when said spring is under torsional tension, see Figure 7. The ends 36 and 37 of the spring 30 furthermore engage a post 38, extending downwardly from the gear 26. This post 38 is extended through the top disc 24 of the drum 14 and so related to the post 35, that post 38 can freely rotate around the shaft 15 and the hub 31 connected therewith without interfering with the upwardly extending post 35. The post 38, which terminates just above the disc 32, effects the rotation of the drum 14 against the torsional force of the spring 30, when the gear 26 is rotated in either direction by the mechanism now to be described, and thus insures automatic resetting of the drum to its neutral position at will of the operator.

The operating mechanism for the gear 26 and therewith for the drum 14 embodies two push buttons 39 and 40, the push button 39 effecting a left-handed rotation of the drum and the push button 40 effecting a right-handed rotation of said drum. Thus the two push buttons carry at their lower ends rack bars 41, 42 respectively, which bars are symmetrically arranged with respect to the gear 26 for cooperation therewith. The rack bars 41, 42 are guided in brackets 43, which brackets are secured by means of screws 44 to the middle portion 3 of the housing. The push buttons 39 and 40 extend through openings 45 in the cover 4 to permit of these buttons being readily actuated upon by the operator. It should be noted that these push buttons are coupled with each other by the gear 26 and that therefore the operator, when actuating one button, simultaneously shifts the other button, as a downward movement of one button effects an upward movement of the other button and vice versa.

The shape of the contact segments 28, which 75 cooperate with the contact members 9 permits

of five consecutive positions of the master switch for forward and for reverse operation of a motor, as will readily be seen from an inspection of Figure 8. This figure shows diagrammatically the electric coupling of the five position push button operated master switch with a reversing magnetic panel having five speed points, the panel being connected with a slip ring motor 46. Such magnetic reversing panels being old in the art and not subject to this invention, a tracing of the circuits for the different speeds of the motor is thought to be superfluous and therefore omitted, the diagram being merely shown to indicate an application of the master switch.

Multi-position push button operated master switches of the type described are particularly adapted for manual control of motors in machine tools, hoisting apparatus and so forth. When used for hoisting apparatus these switches may be used with the so called stiff arm control of the carriage, as these switches can readily be attached to and suspended from the carriage by means of a stiff arm lever extended from the carriage. For pendent control, a wire cable, not shown, can be attached to a perforated rib 47 on the middle portion 3 of the housing, so as to release strain on the flexible conduit to the switch. A handle bar 48, arranged on the cover 4 just below the push buttons 39 and 40 permits 30 of convenient operation of the switch.

Having thus described my invention, what I claim is:

1. A master switch for a stiff arm control hoist comprising a housing, a handle bar extended from said housing parallel to the longitudinal axis thereof, reversible rotary switch mechanism in said housing substantially in alignment with its longitudinal axis, spring means holding said switch mechanism yieldingly in neutral position, and two push button means arranged side by side in rectangular relation with respect to said axis of said housing and coupled with each other and said rotary switch mechanism for rotating same in opposite directions, said push button means extending through said housing just above said handle bar in symmetrical arrangement with respect thereto to permit of single handed simultaneous gripping of said handle and proper actuation of either of the push buttons of said switch mechanism against the force of the said spring means.

2. A master switch comprising a housing having a handle bar extended from its upper front portion parallel to the longitudinal axis of the housing, a shaft having one end rigidly secured to said housing in substantial alignment with the longitudinal axis thereof, a control drum mounted to freely rotate around said shaft, contact members secured to said housing and cooperating with said drum during switching operations, two push button means rectangularly related to said shaft extended through said housing adjacent to each other just above and symmetrically arranged to said handle bar, coupling means connecting said push buttons with each other and said control drum adapted to shift said drum to forward and reverse positions, and yielding means coupled with said shaft and said drum for automatically and simultaneously shifting 70 said drum and push button means to neutral position.

3. A master switch comprising a housing having a chambered extension at its upper front portion, a handle bar extended downwardly from

said chambered extension, a stationary shaft extending through said housing parallel to said handle bar having one end rigidly secured to said housing, a control drum mounted to freely 5 rotate around said shaft, contact members secured to said housing and cooperating with said drum during switching operations, two push button means extended through said chambered extension adjacent to each other and symmetrically 10 arranged to said handle bar, rack bars at the inner ends of said push button means, a gear

engaging said rack bars rigidly secured to the top of said control drum for rotation therewith, and yielding means within said drum connecting said drum and shaft and permitting rotary movements in opposite directions of said drum 5 with respect to said shaft, said coupling means holding said drum yieldingly in neutral position and returning same automatically to its neutral position after each rotary movement of said drum by said push button means.

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